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(56) Patents Cited:

EP 09 21 699 A2
EP 08 36 301 A1
WO 97 28 518 A1

The following information is taken from the documents submitted by the applicant.

Examination request is provided according to § 44 of the German patent code.

(54) Method and arrangement for a wireless e-mail pager for local area networks

(57) The invention pertains to a method and an arrangement (1) for a wireless e-mail pager for local area networks in which individual or all PCs (2) of the local area network are assigned to radio base stations (5) that can communicate with WEPs
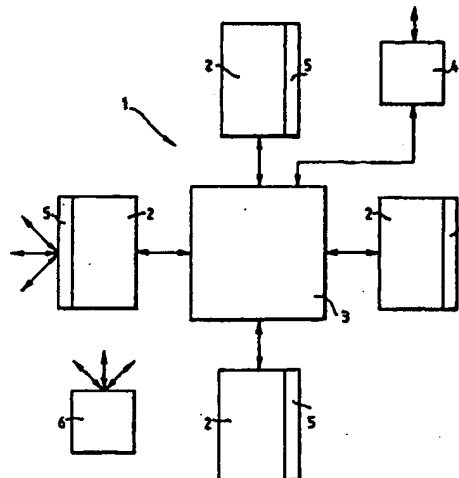
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Description

The invention pertains to a method and an arrangement for a wireless e-mail pager for a local area network.

E-mail is taking on increasing importance in the communication of data in both long-distance data communications and in the exchange of information within local area networks (LANs). A local area network is said to exist if, for example, a number of PCs work from a common server on which central programs and data are stored so that this data can be called via this server and processed at each individual workstation. It should be noted that in the following, the term 'PC' is understood to mean all electronic data processing devices that can be used in local area networks. The local area network communicates with the outside, e.g., to another local area network, by means of a modem over which e-mails, for example, can also be transmitted. Setting up e-mail has recently become greatly simplified, ever since manufacturers of PC operating systems have been including the software modules required for network applications, including e-mail, in the operating program. One problem with the increased use of e-mail is the fact that there is not always any assurance that the addressee of an e-mail actually reads it, because to do so, just like with a conventional mailbox the addressee has to look to see if mail or an e-mail has arrived for him. Since this sometimes requires great self-discipline from the PC user, programs have been developed that call the user's attention to received e-mails when the PC is started up, for example. However, all of these measures assume that the user has turned on his PC and is working on it. If that is not the case, however, access can be delayed for a long time in such a way that the information in the e-mail is superseded, which, depending on the e-mail's content, can have negative consequences.

The invention is thus based on the technical problem of creating an arrangement and a method by means of which an addressee who is away from his PC is able to receive e-mails that have arrived for him, or be informed that an e-mail for him has arrived.

The solution of this technical problem results from the features of Patent Claims 1 and 4. Individual PCs are assigned to radio base stations that download the arriving e-mails from the server and send them out, whereby, if it is located with the range of a radio base station, the transmission can be received by a wireless e-mail pager transceiver that has the correct e-mail address. Thus, through the use of a little switching technology effort, the available infrastructure of the local area network can be fully utilized so that hard-to-use and expensive separate

acoustic or wireless personal call and information systems can be dispensed with. Additional advantageous developments of the invention are found in the subclaims.

In the following, the invention will be described in more detail using the example of a preferred embodiment. The single Figure shows a schematic block diagram of an arrangement for a wireless e-mail pager for local area networks.

The arrangement 1 for a wireless e-mail pager comprises a local area network that includes a number of PCs 2 that are connected with each other by means of a common server 3. Connected to the server 3 in addition is a modem 4, by means of which an exchange of data and communications with computers outside the local area network can take place. A radio base station 5 is assigned to individual or all PCs 2. The distribution of the radio base stations 5 to the individual PCs 2 takes place from the perspective of coverage of the local area network that is as comprehensive as possible. For example, if three PCs 2 are located in one office, it is enough to design only one of the PCs 2 with a radio base station 5. The radio base station 5 includes an RF transceiver and a microcontroller that controls communication with the assigned PC 2. The radio base stations 5 are preferably designed in the form of plug-in cards so that the existing PCs of a local area network can be easily upgraded, and all that is needed in addition is to load special driver software into the PC 2. The radio base stations 5 are then able to communicate with wireless e-mail pagers 6, which will be described in more detail in the following. The wireless e-mail pager 6, WEP for short, also includes an RF transceiver and a microcontroller, along with a display. Every user that has a wired e-mail address is given a WEP 6 with an e-mail address that corresponds to his wired e-mail address, and is able to bring his WEP 6 with him at all times.

Now, if an e-mail is sent from outside via the modem 4 or from inside the local area network, it is received and stored by the server 3. The server then transmits the e-mail to the PC 2 with the associated e-mail address. At the same time, all of the radio base stations 5 regularly poll the server 3 for received e-mails. The radio base stations 5 then load the e-mails from the server 3 and send them via the RF transceiver within the area of their radio range of, for example, 50 m. When a WEP 6 that is located within the range of a radio base station 5 receives an e-mail that is intended for it, the receipt is acknowledged to the radio base station 5 by the WEP 6. With that, the sending of the e-mail is successfully ended, whereupon a corresponding confirmation is transmitted to the server 3. The server 3 can then inform the other radio base stations 5 so that further transmission of the e-mail can be dispensed with. If the sent e-mail is not received by the associated WEP 6, the transmission is repeated by the radio base stations 5, whereby provision can be made that the transmission of the e-mail ceases or is

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stopped after a certain number of failed attempts. After receiving an e-mail, the user of the WEP 6 that was contacted additionally has the option of sending a personal read confirmation in order to signal to the sender of the e-mail that the e-mail has not only been received, it has also been noted.

The sending of the e-mails takes place in unsynchronized fashion by all of the radio base stations 5 in the region of the local area network so that everyone carrying a WEP can be reached. Possible reception interference that might occur in the fringe range of two radio base stations 5 will be corrected automatically, since the radio base stations 5 transmit unsynchronized and the transmissions are repeated at irregular intervals. Error-protected transmission should be used by the radio base stations 5 for sending the e-mails. Transmission takes place in a special time division duplex mode that dispenses with permanent synchronization of radio base stations 5 and WEPs 6 for reasons of cost and energy. The radio base station 5 is the master, and sends first as a matter of principle. The WEP 6 is the slave, and as a matter of principle is set to receive, possibly in interval operation as well. When the radio base station 5 sends an e-mail, it then switches over to acknowledgement receipt for a defined time. The WEP 6 reacts in the reverse way, and sends the acknowledgement within the corresponding time after receiving the e-mail. A special request is sent by the radio base stations 5 to the WEPs 6 at longer intervals in order to query the read status of the e-mails. The period of time reserved for the receipt of responses is chosen to be somewhat longer than before, and gives the WEPs 6 with e-mails that have been read the opportunity to send their read confirmation to the radio base stations 5 in accordance with a random time function. Because the WEPS 6 only have to send out brief acknowledgement signals, their power can be supplied by a solar-powered storage battery, and are thus nearly maintenance-free. In the case of e-mails that are above a maximum size that can be specified in advance, the radio base station 5 sends only the subject information and the sender. That way, the radio network is not overloaded and the display size of the WEPS 6 can be kept within reasonable limits. The complete e-mail is sent to the appropriate PC 2 via the LAN.

The new Europe-wide frequencies of 868-870 MHz are especially well-suited for the radio transmission, since burst operation that is suitable in this instance is prescribed in any case, and the propagation conditions as well as the effectiveness and price of the HF components are especially favorable. Other than that, the known iSM bands at 433 MHz and 2.4 GHz or other country-specific frequency bands also come into consideration for general, license-free use.

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List of Reference Symbols

1 Arrangement

2 PC

3 Server

4 Modem

5 Radio base station

6 Wireless e-mail pager (WEP)

Patent Claims

1. Arrangement for a wireless e-mail pager for local area networks, whereby the local area network includes a number of PCs that communicate with each other by means of at least one common server, **characterized in that** assigned to at least a number of PCs (2) are radio base stations (5) that are designed to be able to communicate with mobile wireless e-mail pagers (6).

2. Arrangement according to Claim 1, characterized in that the radio base station (5) is designed as a plug-in card.

3. Arrangement according to Claim 1 or 2, characterized in that the radio base station (5) and the wireless e-mail pagers (6) are tuned to the frequency range of 433 MHz, 868-870 MHz, 2.4 GHz or other generally usable frequencies typical of the nation.

4. Method for a wireless e-mail pager for local area networks, by means of an arrangement (1) in accordance with Claim 1, including the following method steps:

    a) Receipt of an e-mail by server (3),

    b) Transmission of the e-mail to all radio base stations (5),

    c) Sending out of at least a part of the e-mail, including the e-mail address and

    d) Receipt of the e-mail by the relevant wireless e-mail pager (6), if it is located within the range of one of the radio base stations (5).

5. Method according to Claim 4, characterized in that following receipt of the e-mail, the wireless e-mail pager (6) acknowledges the receipt to the radio base station (5), which then transmits a status message to the server (3).

6. Method according to Claim 4 or 5, characterized in that the transmission between the radio base stations (5) and the WEPs (6) takes place by means of a non-synchronized time division duplex mode.

7. Method according to one of the Claims 4 through 6, characterized in that the WEPs (6) additionally send a read confirmation to the radio base stations (5).

In addition, 1 page(s) of drawings